Experience with Reburn for NOx Emissions Control

Don Engelhardt
don.engelhardt@ps.ge.com

Roy Payne
roy.payne@ps.ge.com

David Moyeda
david.moyeda@ps.ge.com

Blair Folsom
blair.folsom@ps.ge.com

GE Energy
18 Mason, Irvine, CA 92618
Phone: 949-859-8851; Fax: 949-859-3194

Summary

Reburn technology can provide substantial reductions in NO_X emissions from coal-fired boilers, particularly when applied in conjunction with other NO_X emissions control technologies such as low-NOx burners and selective non-catalytic reduction (SNCR) technology. Layering of NO_X control technologies can permit NO_X emissions levels of less than 0.15 lb/MMBtu to be attained more cost-effectively than selective catalytic reduction (SCR) technology. Technology layering also provides flexibility for operating the system to minimize operating cost while meeting system-wide NO_X emissions targets.

GE Energy has applied reburn technology to a wide range of boiler firing configurations, including tangential, wall, and cyclone fired boilers, using natural gas, fuel oil, or coal as the reburn fuels. In a recent project, a coal reburn system was retrofit to two 250 MW opposed wall fired boilers firing bituminous coal. The coal reburn system was designed to use coal from one of the plant's existing mills in order to minimize the retrofit cost. The system included the use of coal flow balancing dampers to ensure uniform coal distribution to the burners and reburn fuel injectors and advanced combustion sensors, including an in-situ CO sensor grid, to support system optimization. NO_X emissions levels of less than 0.15 lb/MMBtu were achieved by optimization of the coal reburn system and low-NO_X burner operation. Low NO_X emissions were achieved without significant increases in carbon loss or a degradation of boiler performance.

In a second project, a gas reburn system was retrofit to a 120 MW tangential fired boiler firing bituminous coal. Operation of the gas reburn system in conjunction with an SNCR system resulted in NO_X emissions levels of less than 0.11 lb/MMBtu. To minimize operating cost, the gas reburn system can be operated with or without the reburn fuel injectors in service, depending upon the level of NO_X emissions reduction needed and the price of natural gas. The results of these different projects demonstrate that reburn technology and technology layering can provide cost-effective NO_X control for the utility industry.